What We Claim Is:

1. An apparatus for diagnosing an under-performing photovoltaic element, the photovoltaic element functioning to convert solar energy to electricity and including a face receiving the solar energy, the apparatus comprising:

a by-pass diode electrically connected in parallel with the photovoltaic element, the by-pass diode operating between first and second states, the first operating state of the by-pass diode corresponding to a functional condition of the photovoltaic element, and the second operating state of the by-pass diode corresponding to a dysfunctional condition of the photovoltaic element; and

an indicator electrically coupled to the by-pass diode, the indicator including first and second modes, the first mode of the indicator signifying the first operating state of the by-pass diode, and the second mode of the indicator signifying the second operating state of the by-pass diode.

2. The apparatus according to claim 1, wherein the indicator is located on the face of the photovoltaic element.

3. The apparatus according to claim 1, wherein the indicator comprises a first light emitting diode.

4. The apparatus according to claim 3, wherein the light emitting diode is electrically coupled in parallel with the by-pass diode.

5. The apparatus according to claim 4, wherein the light emitting diode changes between the first and second modes in response to voltage differences between the first and second operating states of the by-pass diode.

6. The apparatus according to claim 4, wherein the light emitting diode is illuminated in the first mode and is non-illuminated in the second mode.

7. The apparatus according to claim 3, wherein the light emitting diode is electrically coupled in series with the by-pass diode.

8. The apparatus according to claim 7, wherein the light emitting diode changes between the first and second modes in response to polarity differences between the first and second operating states of the by-pass diode.

9. The apparatus according to claim 7, wherein the light emitting diode is non-illuminated in the first mode and is illuminated in the second mode.

10. The apparatus according to claim 1, wherein the indicator comprises a diagnostic circuit electrically coupled in parallel with the by-pass diode.

11. The apparatus according to claim 10, wherein the diagnostic circuit comprises measuring, identifying and sending features.

12. The apparatus according to claim 11, wherein the measuring feature comprises an analog-to-digital converter.

13. The apparatus according to claim 12, wherein the measuring feature comprises a conditioning algorithm, the by-pass diode inputting to the conditioning algorithm a first analog signal commensurate with the operating state of the by-pass diode, the conditioning algorithm outputting to the analog-to-digital converter a second analog signal scaled to a nominal voltage range, and the analog-to-digital converter outputting to the sending feature a digital signal representative of the functioning of the photovoltaic element.

13. The apparatus according to claim 11, wherein the identifying feature comprises a digital number being output to the sending feature.

14. The apparatus according to claim 13, wherein in the digital number is generally unique to the photovoltaic element.

15. The apparatus according to claim 11, wherein the sending feature consists of at least one of a wireless radio frequency transmitter and a communication wire.

16. The apparatus according to claim 10, wherein the diagnostic circuit comprises:

a conditioning algorithm, the by-pass diode inputting to the conditioning algorithm a first analog signal commensurate with the operating state of the by-pass diode;

an analog-to-digital converter, the conditioning algorithm outputting to the analog-to-digital converter a second analog signal scaled to a nominal voltage range, and the analog-to-digital converter generating a digital signal representative of the functioning of the photovoltaic element;

a digital identifier being generally unique to the photovoltaic element; and

a transmitter outputting a record including a combination of the digital signal and the digital identifier.

17. The apparatus according to claim 16, wherein the analog-to-digital converter and the transmitter are integrated on a single chip, and the conditioning algorithm and the digital identifier are stored in read-only-memory on the single chip.

18. The apparatus according to claim 17, wherein the by-pass diode and the single chip are commonly mounted on a printed circuit board.

19. The apparatus according to claim 18, wherein the transmitter comprises an antenna being etched on the printed circuit board.

20. The apparatus according to claim 16, the apparatus further comprising:

an analyzer evaluating the functioning of the photovoltaic element based the mode of the indicator.

21. The apparatus according to claim 20, wherein the analyzer comprises a receiver, an analysis algorithm, data storage and a data transmitter, the record output from the transmitter being input to the receiver, the analysis algorithm transforming the record to measurements of

the functioning of the photovoltaic element and comparing the measurements with previous measurements, the data storage compiling a history of the measurements, and the data transmitter outputting the measurements.

22. The apparatus according to claim 21, wherein the transmitter modulates a radio frequency signal that is demodulated by the receiver.

23. An apparatus for diagnosing an under-performing photovoltaic element, the photovoltaic element functioning to convert solar energy to electricity, the apparatus comprising:

an electricity sensing device connected to the photovoltaic element, the electricity sensing device detecting a voltage condition of the photovoltaic element; and

an indicator electrically coupled to the device, the indicator including first and second modes, the first mode of the indicator signifying a functioning state of the photovoltaic element, and the second mode of the indicator signifying a functioning state of the photovoltaic element having not been achieved.

24. The apparatus according to claim 23, wherein the electricity sensing device comprises a by-pass diode electrically connected in parallel with the photovoltaic element.

25. The apparatus according to claim 24, wherein the indicator comprises at least one of a light emitting diode and a diagnostic circuit.

26. A photovoltaic module for mounting on a structure, the photovoltaic module comprising:

first and second module faces and an edge that extends between the first and second module faces, the first module face receiving solar energy and the second module face being adapted to generally confront the structure;

a plurality of photovoltaic cells being commonly supported by a base, each of the photovoltaic cells converting the solar energy to electricity; and

a device connected to one of the plurality of photovoltaic cells and operating between first and second states, the first operating state of the device corresponding to a functional

condition of the at least one of the plurality of photovoltaic cells, and the second operating state of the device corresponding to a dysfunctional condition of the at least one of the plurality of photovoltaic cells.

27. The photovoltaic module according to claim 26, further comprising:

a plurality of the devices corresponding in number to the plurality of photovoltaic cells, each of the plurality of devices operating between first and second states, the first operating state of each of the plurality of devices corresponding to a functional condition of a corresponding one of the plurality of photovoltaic cells, and the second operating state of each of the plurality of devices corresponding to a dysfunctional condition of the corresponding one of the plurality of photovoltaic cells.

28. A system for diagnosing a photovoltaic array, the photovoltaic array including a plurality of photovoltaic elements functioning to convert solar energy to electricity, the system comprising:

a first by-pass diode electrically connected in parallel with a first one of the plurality of photovoltaic elements, the first by-pass diode operating between first and second states, the first operating state of the first by-pass diode corresponding to a functional condition of the first photovoltaic element, and the second operating state of the first by-pass diode corresponding to a dysfunctional condition of the first photovoltaic element;

a first diagnostic circuit electrically coupled to the first by-pass diode, the first diagnostic circuit including first and second modes, the first mode of the first diagnostic circuit signifying the first operating state of the first by-pass diode, and the second mode of the first diagnostic circuit signifying the second operating state of the first by-pass diode;

a second by-pass diode electrically connected in parallel with a second one of the plurality of photovoltaic elements, the second by-pass diode operating between first and second states, the first operating state of the second by-pass diode corresponding to a functional condition of the second photovoltaic element, and the second operating state of the second

by-pass diode corresponding to a dysfunctional condition of the second photovoltaic element; and

a second diagnostic circuit electrically coupled to the second by-pass diode, the second diagnostic circuit including first and second modes, the first mode of the second diagnostic circuit signifying the first operating state of the second by-pass diode, and the second mode of the second diagnostic circuit signifying the second operating state of the second by-pass diode.

29. The system according to claim 28, wherein the first diagnostic circuit comprises a first transmitter and a first digital identifier being generally unique to the first photovoltaic element, the first transmitter outputting a first digital record including a combination of the first digital identifier and a first digital signal, the first digital signal being proportional to the functioning of the first photovoltaic element; and wherein the second diagnostic circuit comprises a second transmitter and a second digital identifier being generally unique to the second photovoltaic element, the second transmitter outputting a second digital record including a combination of the second digital identifier and a second digital signal, the second digital signal being proportional to the functioning of the second photovoltaic element.

30. The system according to claim 29, the system further comprising:

an analyzer receiving the first and second digital records, the analyzer including an analysis algorithm transforming the first and second digital records to corresponding independent measurements of the functioning of the first and second photovoltaic elements, respectively, and comparing the independent measurements with previous independent measurements of the corresponding first and second photovoltaic elements.

31. The system according to claim 30, wherein the analyzer comprises data storage and a data transmitter, the data storage compiling histories of the measurements, and the data transmitter outputting the measurements.

32. The system according to claim 30, wherein the first and second transmitters modulate via a radio frequency carrier the first and second digital records, and the analyzer comprises a receiver demodulating the radio frequency carrier.

33. The system according to claim 32, wherein the first and second transmitters include a time domain multiple access scheme to share the radio frequency carrier.

34. A method of evaluating performance of a photovoltaic array including a plurality of photovoltaic elements, each of the photovoltaic elements functioning to convert solar energy to electricity, the method comprising:

diagnosing independently the functioning of individual photovoltaic elements, the diagnosing including a separate diagnostic circuit for each of the individual photovoltaic elements; and

identifying under-performing individual photovoltaic elements within the photovoltaic array, the identifying including analyzing contemporary and historical measurements of the individual photovoltaic elements.

35. The method according to claim 34, wherein the diagnosing is performed locally with respect to the individual photovoltaic elements, and the identifying is performed remotely with respect to the individual photovoltaic elements.

36. A method of monitoring individual performance of each of a plurality of photovoltaic elements, each of the plurality of photovoltaic elements function to convert solar energy to electricity, the method comprising:

evaluating individually a status of each of the plurality of photovoltaic elements;

communicating the status of each of the plurality of photovoltaic elements; and

analyzing performance of each of the plurality of photovoltaic elements.

37. The method according to claim 36, wherein the analyzing comprises determining a set of the plurality of photovoltaic elements that are not achieving a desired function; and

servicing the set of the plurality of photovoltaic elements based on the analyzing.

38. The method according to claim 37, wherein the analyzing comprises sending the set of the plurality of photovoltaic elements to a remote location.